Air Force and Private Sector Benefit from Infrared High Power Diode Laser (HPDL) Program

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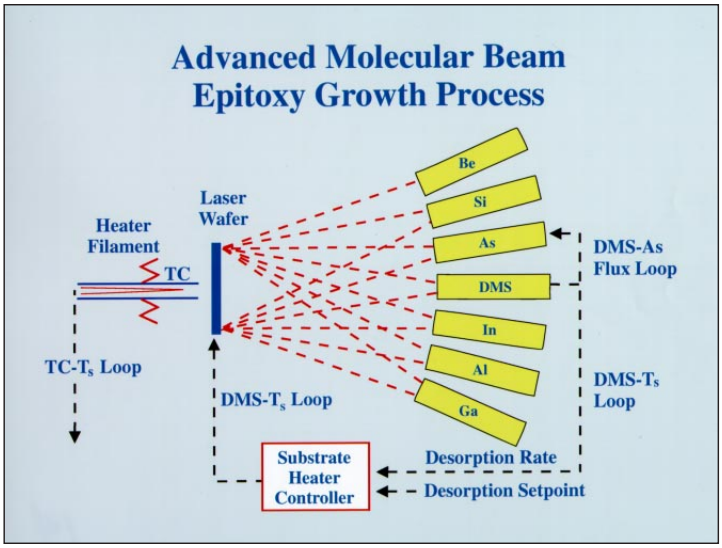

Payoff

As a result of the Cooperative Research and Development Agreement (CRDA) between the Air Force and Semiconductor Laser International, infrared HPDL performance has been enhanced and cost has been reduced. Low cost infrared HPDLs, made possible by improvements in desorption mass spectrometry (DMS), open up a whole range of important Air Force applications which are not feasible at higher HPDL costs.

Accomplishment

Research in crystal growth kinetics in the Sensors Directorate has evolved into a patented crystal growth process control technology, called desorption mass spectrometry control of molecular beam epitaxy (MBE). This process has been licensed and transferred, via a CRDA, to Semiconductor Laser International (SLI) of Binghamton NY. This technique has enabled the monitoring and controlling of growth conditions during MBE growth to produce ultra-thin, layered, heterojunction crystalline structures for advanced laser applications.

Background

The primary objective of the CRDA was to significantly enhance the yield and reduce the cost associated with the production of HPDLs radiating in the infrared spectrum. The yield enhancement comes from the dramatic improvement DMS provides in the ability to control the MBE growth process used to produce the underlying crystalline structures required to make HPDLs. Previous crystal growth approaches used for infrared HPDL production suffer from poor yields associated with poor control of the crystal growth process, which resulted in high costs and long delivery times. Low cost infrared HPDLs are required for a multitude of military (such as high resolution range-finding) and commercial (such as pollution monitoring, medical, dental, automotive, data storage, printing and telecommunications) technologies. For example, SLI is working with Coherent Technologies Incorporated on a very powerful high resolution range-finding application. Infrared HPDLs offer the potential to improve the ability to accurately and rapidly designate targets, differentiate between friend and foe, accurately and rapidly determine upstream wind shear conditions, and to map out air turbulence to greatly enhance the accuracy of bombing strikes.